Dirk-Michael Harmsen
Anke Matuschewski
Fraunhofer Institute for Systems and Innovation Research
FhG-ISI

Technical Working Document
30.04.1999

BARRIERS AND POLICY ISSUES FOR THE DEPLOYMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY IN ROAD TRANSPORT

Distribution: TNO
TECHNUM

Number of pages: 11

BARRIERS AND POLICY ISSUES FOR THE DEPLOYMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY IN ROAD TRANSPORT

List of Contents

BARRIERS AND POLICY ISSUES FOR THE DEPLOYMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY IN ROAD TRANSPORT

by

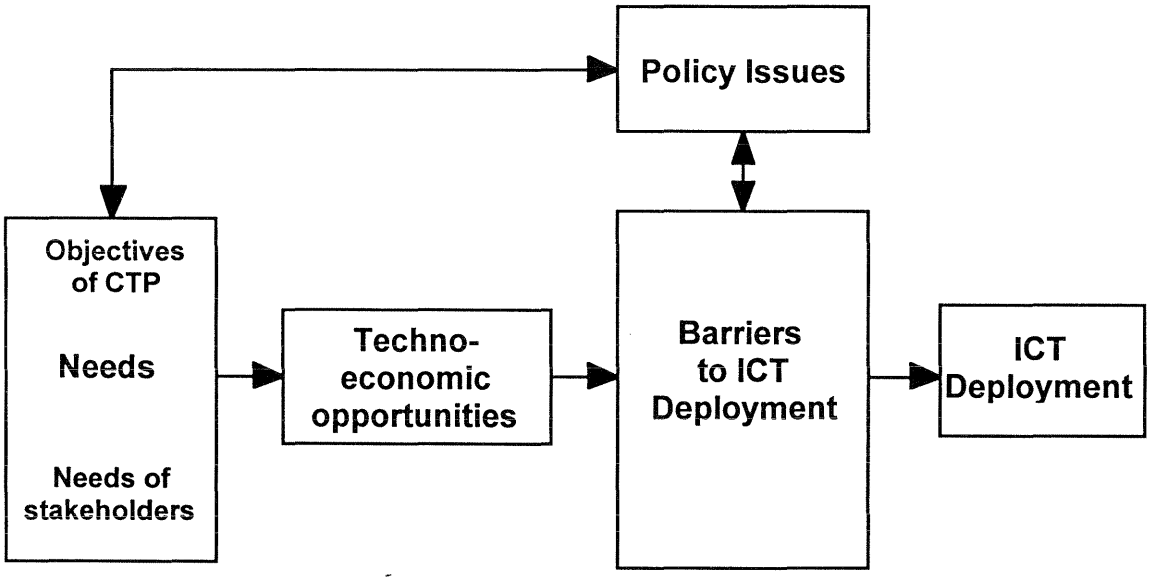
Dirk-Michael Harmsen and Anke Matuschewski

Fraunhofer Institute for Systems and Innovations Research (FhG-ISI), Karlsruhe, Germany

1 Introduction

This paper addresses barriers and policy issues for the deployment of Information and Communication Technologies (ICT) in road transport. It builds upon an earlier paper[1] about needs and opportunities for the use of ICT in road transport. The general line of discussion is visualised in Figure 1 and can best be described as a process in which firstly actors or stakeholders and their needs are taken into focus, secondly techno-economic opportunities that may help to fulfil the needs, thirdly apparent barriers towards the deployment of ICT and, finally, policy issues. Viewed from a policy perspective, the barriers must be regarded as parts of policy issues to be addressed.

Figure 2: From needs to policy issues with regard to ICT deployment in road transport[2]



[1] Harmsen, D.-M. and A. Matuschewski, *Needs and Opportunities for the Use of Information and Communication Technology in Road Transport*, TRANSINPOL project funded by EC DG VII under contract ST-96-AM-1152, Technical Working Document WP2/ISI/006.0, Karlsruhe: Fraunhofer Institute for Systems and Innovation Research (FhG-ISI), 04.02.1999, 10 p.

[2] Harmsen, D.-M., A. Matuschewski, T. M. Verduijn and J. Gauderis, *TRANSINPOL: Policy Requirements for the Integration of Information and Communication Technology in the Transport Sector*, paper to be presented at the 32nd ISATA International Symposium on Automotive Technology & Automation, 14-18 June 1999, Vienna, Austria, 8 p.

2 Barriers against the deployment of Information and Communication Technologies (ICT) in road transport

Amount of data: Most ICT applications in road transport very much depend on complex data. Sometimes, there is a lack of data or just the opposite: too many data. Often, the same data is used for different purposes, e.g. traffic flow data are used for 'traffic management', for 'travel and traffic information' and for 'route guidance'. That means, that the original data have to be processed differently for the different purpose. Sometimes processed data with the appropriate 'granularity' is not necessarily available at the right time at the point of further processing for a particular application. The lack of data is still quite often a problem for effective traffic management in agglomeration areas (e.g. sparsity of locations of traffic flow data acquisition).

Incompatibility of data: In spite of standardisation of data formats there are still problems to combine data from different data sources. Again, traffic flow data might serve as an example. Data are produced by inductive loop detectors, by video equipment, by roadside beacons or by signals from a process called 'Floating Car Data' measurements. In addition, there might be data in the form of recorded voice, e.g. by police officers on the scene in case of traffic congestions or traffic incidents, or by drivers of road vehicles which have to be combined with automated measurements of traffic flow. It is not a trivial process to combine these data and to further transmit them to other processors (e.g. other traffic information centres).

Lack of interconnectivity: The variety of data processing programmes currently in use produce outputs that cannot necessarily be used directly by other data processing systems for other purposes in road transport. Apparent problems still exist for the exchange of data between different local and regional authorities and private value added service providers due to different standards that are used for data storage (e.g. in Geographical Information Systems (GIS)) and for data transmission.

Complexity of data and functions: This barrier is closely related to the barrier 'amount of data'. The complexity of data is due to the relatively large number of data sources for different purposes and a large number of different and often individual users of such data. Take the example of fleet management. Dispatcher of a logistic service provider need not only data about the current location of their vehicles (positioning by GPS data) and their destination (road guidance suggestions by public or private service providers), they also have to receive monitoring data about the vehicle performance (e.g. engine and vehicle functions, fuel consumption, conditions of brakes) and the transported goods (e.g. temperature), and they need various data for running their simulation programmes to forecast travel times of their vehicles, to re-arrange travel schedules, to prepare a storage plan for the transported goods in the vehicle and so forth.

Uncertain revenues: While costs for an innovative transport telematics application can relatively certain be calculated at the time of its introduction, the corresponding revenues might remain relatively uncertain for quite a while. This is certainly a barrier to be dealt with (see above: Costs of products and services).

Differences in national regulations: In spite of the lead that the European Commission has taken to synchronise the legal frameworks of the member states of the European Union, there are still many differences in national regulations, for instance for the supply and the accessibility of data from public sources, for data security and data protection, for transactional matters (signature of documents, information storage for auditing processes), for matters of law enforcement in case of traffic violations.

Uneven distribution of power of actors: Considering the many different groups of actors and stakeholders in the area of road transport (see above) it is not surprising that their power is unevenly distributed. This imbalance of power must be considered as a barrier for the fast realisation of some of the Common Transport Policy objectives. This can be examplified for the objective 'protection of the environment' and the choices of means to reach the goals: introduction of an ecological oriented taxation of fossil fuels or of road pricing. According to the opinion voiced by the European Commission progress has been slower than hoped in this area:[3] "Whilst there is a valuable debate on the desirable approach to charging for infrastructure and external costs,[4] divergences of opinion and practice remain.[5] It is of vital importance that the Member States give a constructive response to the suggestions, procedural and substantive, made in the recently published White Paper[6] 'Fair Payment for Infrastructure Use'."

Operational deficiencies: "A chain is only as strong as its weakest link". This proverb also holds for ICT applications in road transport. The functionality of complex ICT systems depends very much on the reliable functioning of all its components and sub-systems (e.g. permanent availability of communication links, availability of up-to-date monitoring data of traffic flow and other relevant data sources for traffic management, traffic and travel information,

---

3 European Commission, DG VII, *The Common Transport Policy (CTP). Sustainable Mobility: Perspectives for the Future*, Communication to the Council, the European Parliament, the Economic and Social Committee and the Committee of Regions, COM(1998) 716.

4 European Commission, DG VII, *Towards fair and efficient pricing in transport policy – options for internalising the external cost of transport in the European Union – Green Paper*, Communication to the Council, the European Parliament, the Economic and Social Committee and the Committee of Regions, COM(95) 692 final, 20.12.1995.

5 Difficulties have affected the proposals for a Council Directive restructuring the Community framework for the taxation of energy products (COM/97/30 final of 12 March 1997).

6 European Commission, DG VII, *Fair payment for infrastructure use: a phased approach to a common transport infrastructure charging framework in the EU - White Paper*, Communication to the Council, the European Parliament, the Economic and Social Committee and the Committee of Regions, COM(98) 466 final, 22.07.1998.

Organisational/institutional issues:

For ICT applications in the area of traffic and travel information the following organisational issues can be distinguished: (1) How can publicly owned data resources and infrastructures be made accessible for private actors (content providers, service operators and service providers)? (2) How can best be organised the co-operation between local, regional, national and international authorities, all running their particular traffic information centres? (3) What will be the future role of public authorities with regard to the supply of traffic data, to demand management and the operation of telematic systems? (4) Considering only a particular system, the RDS/TMC (Radio Data System – Traffic Message Channel), the following key issues need to be addressed:[8]

- Cross border road traffic data exchange.
- Facilitation of the formation of public-private partnerships and more generally the participation of the private sector in the provision of Transport Telematic services.
- Definition of the principles and rules for access to public traffic data by the service providers and for the exchange of public and privately owned traffic data.
- Possibility of service providers (public or private) to broadcast/disseminate travel and traffic information.
- Definition of a framework to allow for traffic monitoring by independent traffic service providers (public or private sector or in partnership). This should include the possibility of installation and maintenance of traffic monitoring equipment along the roads.

Due to increasing demands for transport of people and goods the existing infrastructures (roads, railways, inland waterways, airspace) get more and more congested, in particular in agglomeration areas. Tendencies of congestion of traffic on roads could be alleviated by introducing "*slot management on roads*", i.e. by dynamically allocating infrastructure capacity for different transport tasks in time. In other words: during rush hours public transport and commuter traffic gets priority compared with transport of goods. For informing the users reasonably in advance about the dynamic allocation of slots for road usage it is necessary to use different means of advanced telematics systems like personal travel assistants, the internet, mobile phones etc. Besides technical tasks, the development and implementation of such a comprehensive system needs close co-operation and co-ordination of different actors.

---

[8] cf. http://www.dg13c6.org/transport/deployment/5424.htm.

inter alias, to identify key legal issues for this application and potential solutions to legal issues as well as to recommend approaches to harmonisation within the EU. The Report on Legal, Operational and Institutional Issues in Enforcement is due in July 1999.[9]

Currently, there are risks of infringements of privacy in various transport telematics systems. This is a policy issue that must be taken into account.[10] Based on the common understanding within the European Union as well as in other parts of the world, that the use of data processing systems must respect the fundamental rights and freedoms of individuals, notably the right of privacy, it is of paramount importance that all transport telematics systems are implemented only under the condition that the principle of minimisation of personal data collection is realised. This principle, as it is written into article 3.4 of the German Act on Data Protection in Teleservices (Gesetz über den Datenschutz bei Telediensten - Teledienstedatenschutzgesetz - TDDSG)[11] of 13 June 1997, should be translated into European law.

Social issues:

How can "informational segregation" of users with respect to traffic and travel information be prevented? How can minimum levels for publicly available traffic and travel information be guaranteed? Will rural or sparsely populated areas receive an equivalent service like agglomeration areas?

How can the awareness to the need and the acceptance for measures concerning fair payment for infrastructure use be raised for the different groups of road users?

How can the competence of users for the correct handling of complex advanced ICT systems generally be raised?

---

9 cf. VERA Video Enforcement for Road Authorities, http://www.ertico.com/activiti/projects/veracon.htm (22.04.99).

10 cf. Harmsen, D.-M. (1998), *Data Protection and Security in Information Technology Applications: A Policy Issue in Transport Telematics Applications*, TRANSINPOL project funded by EC DG VII under contract ST-96-AM-1152, Technical Working Document WP2/ISI/005.0, Karlsruhe: Fraunhofer Institute for Systems and Innovation Research (FhG-ISI), 15.03.1998, 6 p. (ISI-A-4-98).

11 cf. German Act on Data Protection in Teleservices (1997), Gesetz zur Regelung der Rahmenbedingungen für Informations- und Kommunikationsdienste (Informations- und Kommunikationsdienste-Gesetz - IuKDG) in der Fassung des Beschlusses des Deutschen Bundestages vom 13. Juni 1997, BT-Drs. 13/7934 vom 11.06.1997.

- an agreement on Guidelines for the arrangement and the installation of ICT systems in motor vehicles by the Wirtschaftsforum Verkehrstelematik in November 1996,[15]
- the German Act on Data Protection in Teleservices in June 1997,[16]
- a model contract for the delivery and sale of traffic data from traffic management centres of the German Federal Government in April 1998,[17]
- a model contract between the Deutsche Städtetag, representing all German municipalities, and the Zentralverband Elektrotechnik- und Elektronikindustrie (ZVEI), representing the industry, about the transfer of traffic relevant data between municipalities and private service providers in November 1998,[18]
- Guidelines for the public-private collaboration regarding telematic services, agreed by the Wirtschaftsforum Verkehrstelematik in February 1999.[19]

The extension to internationally functioning PPP should be the next step to be addressed by the European Commission with respect to the further development of its Common Transport Policy.

One aspect is of particular importance: all ICT systems and services deployed in road transport should emphasise inter-modal transport and travel information systems and should not only optimise this single mode. First steps in this direction are for example the Mobility Information Networks (MobIN) that are built-up in Germany.[20]

---

15 cf. Bundesministerium für Verkehr; Bau und Wohnungswesen, Telematik im Verkehr, ITS: Integrierte Transport-Systeme für Mobilität und Umwelt, Materialsammlung: Rahmenbedingungen der Verkehrstelematik, Bonn: BMVBW, 24.03.1999.

16 German Act on Data Protection in Teleservices (1997), Gesetz zur Regelung der Rahmenbedingungen für Informations- und Kommunikationsdienste (Informations- und Kommunikationsdienste-Gesetz - IuKDG) in der Fassung des Beschlusses des Deutschen Bundestages vom 13. Juni 1997, BT-Drs. 13/7934 vom 11.06.1997.

17 Bundesministerium für Verkehr, Abgabe und Verkauf von Verkehrsdaten aus Verkehrsrechnerzentralen des Bundes, StB 13/38.58.60-90/5 Va 96, Bonn: BMV, 09.04.1998.

18 see ref. 15.

19 see ref. 15.

20 cf. http://www.mobilist.region-stuttgart.de/basis/land/index.html (30.04.1999).